

IMPROVEMENTS TO ORTHODONTIC SUPPORTS APPLICABLE TO TEETHDESCRIPTIVE SUMMARY

This invention refers to improvements to orthodontic supports applicable to teeth, that is, the so-called "brackets" used in this medical type technology.

The improvements, which are the subject of this current invention, refer in particular to the so-called "brackets" which have retention devices for edge elements or wires intended for the interrelationship of said "brackets" among themselves and with other elements, for the purpose of allowing the desired function of the affected teeth. In particular, the improvements which are the subject of this current invention allow the closure element of the passing slot for the wire to be retained in a safe manner in a waiting position before completing the closure of said slot and thusly once said closure is effected.

To reach these objectives, the improvements which are the subject of this invention provide for the placement of a sliding closure element for the wire receiving slot which can be slid along the length of guide in the body of the "bracket" in a form fitted into a part of the slide or moving piece, having preferentially the form of an arc of a circle, remaining in said guide and also in the fitted part which is intended to coincide with same, each set of ridges and grooves allowing it to be connected to the next elastic retainer for the slide in a waiting position before the placement of the inter-relating wires of said "brackets" and another position from which the closure of said slot can be completed. The stability of the slide, which can move in either direction notably, facilitates the manipulation of the "bracket".

In the same way, the "bracket" design complex facilitates a more rational use, reduction of weight and a structure that is more tolerated in regular use in the mouth cavity.

A different version of the invention, which is simpler, provides

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that the base of the support be given a longitudinal ridge, preferably in the shape of a dovetail, in whose upper edge are placed the profiles or ridges for the retention of the slide which, in this case, has a longitudinal slot fitted to the element on the base, sliding along the length of same and having at the bottom the shape of the conjugated profiles of the transverse ridges or grooves which are to hold the stable end positions of the slide in its movement, that is to say, the open and closed positions.

Figures 1, 2, and 3 are each illustrations of the front view, the lateral view and the top view of a tooth support piece for orthodontic purposes or "bracket" for these improvements.

Figures 4, 5, and 6 are each cross-sectional views in the indicated planes showing the guiding arrangement and the retaining elements of the moving slide and the guide.

Figure 6 following (page 3/11) shows a variation in the guide with dovetail.

Figure 7 shows in perspective the position of the moving slide and the guide at the moment of placement of the former.

Figure 8 shows in perspective a view of the slide to be placed in the holder or "bracket".

Figures 9 and 10 are each views of one of the retaining pieces in accordance with this invention, in perspective, in the closed position for holding the wire.

Figures 11 and 12 are similar views to those in Figures 9 and 10, with the piece or "bracket" open.

Figure 13 shows a top view of a double type holding piece or "bracket" which incorporates the current improvements.

Figure 14 shows a perspective view of a support piece for teeth for orthodontic purposes or "bracket" according to a variation of the current invention.

Figure 15 shows a similar view to that of Figure 14 with a longitudinal cross-section, showing the slide in the open position.

Figure 16 is a view similar to that of Figure 15 showing the slide in the closed position.

Figure 17 shows a perspective view of the slide with the longitudinal guide to be fitted in the ridge of the base.

Figure 18 shows a front view from one end.

Figure 19 shows a perspective view similar to Figure 14 with the placement of a ridge for the retention of the slide at the extreme position.

Figure 20 shows a view in longitudinal section of the base, showing the slide in the open position in the version corresponding to Figure 19.

As can be seen in the figures, the "bracket" which is the object of this current improvement consists of a unitary body -1- of appropriate material, with a base -2- which has on its bottom a special adhering finish as can be seen as indicated by the number -3- in Figure 10, having on top the anchoring zone for the edged elements or wires used to inter-relate different "brackets" among themselves composed of two arms -4- and -5- separated by a relatively deep slot -6- in which will be inserted said connecting wire.

As a set, body -1- has on its upper part an arched shape that affects arms -4- and -5- and wide slightly curved sides -7- and -8- that separate said arms from the lower part of said body. The base -2- is meant for adaptation to a tooth, for which purpose the finish -3- is intended to increase the adherence that is what allows the fixing of the "bracket" to one of the teeth involved by means of a special adhesive.

The curved upper parts of the arms -4- and -5- have seating parts of the type indicated with numbers -9- and -10-, for the introduction of a tool that will permit their easy manipulation.

Arm -5- has on its upper part a moveable slide -11- that can

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move along the length of a guide, which in the example shown has the noticeably curved shape of an arc of a circle, to allow the movement of said slide -11- from an open position represented in Figures 2 and 5 to a closed position, just as has been shown in Figures 3 and 4.

The guide for the slide -11- will be made, in accordance with the current improvements, with a simple or double dovetail structure, as can be seen in Figure 6, in which the lower ridge of the guide -12- of the slide -11- shows the mentioned structure for its seating in a slot which accommodates it, as indicated by the number -13- in Figures 5 and 7.

The edges of the dovetail and of the corresponding guide may be rounded off to dissipate torsion forces, which otherwise could result in possible structural fractures, as has been shown in Figure 6 bis with numbers -19-, -20-, and -21-.

By means of the arrangement shown, a very easy and precise guidance is made possible for the slide to determine the indicated positions, that is to say, the open and closed positions for the slot for the introduction of wires.

In order to allow the easy introduction of the slide -11- in the guide slot -13-, the latter shall have at its beginning a bevelled or curved entry zone -14-, to make possible an easy presentation of the slide -11-.

In order to obtain a firm and secure retention of the slide -11- in its two extreme positions, that is to say, of the closing and the opening of the curved side -6- for the introduction of the wire, the bottom of the guide slot -13- shall have smooth entry points, indicated by numbers -22- and -22'-, in which can fit the extrusion -16- from the lower part of the guide ridge -12- of the slide -11-. In this way, given sufficient elasticity in the materials employed, it is possible to retain the slide -11- in the two positions mentioned which correspond to the fitting of the ridge -16- in one or the other of the two grooves -22- and -23- previously indicated.

A variation of this current invention shall be composed of a double

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type "bracket", just as has been shown in Figure 13, in which the "bracket" -23- shows two pairs of arms parallel to each other -24-, -24'-, and -25-, 25'- constituted analogously to that described in Figures 1 to 12, where the curved sides can be seen placed parallel to each other -26- and -27- destined to hold the supporting wires.

In the variation portrayed in Figures 14 to 20 the form of a base -101- and arms -102- and -103- are provided both in their single and double versions, with the characteristic that the arm -103- which holds the slide -104- has on its upper side a ridge -105- which in cross-section fits into a groove -106- which runs longitudinally on the slide -104- so that the latter may move well guided by said ridge -105- and by the smooth areas -107- and -108- located laterally on the support -103- on each side of the ridge -105-.

With this disposition, the slide -104- will move along arm -103- with its groove -106- seated in a matched fit to ridge -105- and resting on its lateral edges, which have been shown with numbers -109- and -110- in Figure -104-, on the upper face of the support which has ridge -105-.

To delimit the end positions of the slide, ridge -105- will have stops fitted to others on the slide to delimit the open position and the closed position. Thus, for example, in Figure 14 the transverse grooves -111- and -112- have been shown as being able to receive the transverse ridge -113- on the slide -104- (Figure 15), in order to delimit the open and closed positions.

In the version shown in Figures -106- and -107-, an inverse arrangement is provided in which the slot on the guide -105- has a transverse ridge -114- which fits the transverse grooves -115- and -116- on the slide -104- in order to determine the open and closed positions of the slide moving along the base piece.

It is desired to indicate that, as an example, while it has been shown that the receiving surface of the arm -103- upon which the slide -140- moves has a curved surface, it can also be done in a straight line if desired, conserving the rest of the characteristics provided in this invention.

The material for the fabrication of these supports shall be

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principally ceramic or polymer, but metals or alloys of them may also be used.

In the same way, these current improvements may be applied not only to the single support or "bracket" version but also to the double version.